REMARKS

Interview

Applicants wish to express their appreciation for the courtesy shown to applicants' representative in the recent telephone interview.

Status of claims

All claims have been rejected as unpatentable over Bogdahn (U.S. patent 6,098,428) in argued combination with Yamamura (U.S. patent 6,742,363).

Claim 1 has here been amended to recite a vertical drawing method for producing a cylindrical glass body that comprises continuously feeding a glass cylinder to a heating zone having a vertically oriented heating tube, zonewise softening the glass cylinder, drawing a glass strand from the softened glass cylinder, cutting the glass strand to size to obtain the cylindrical glass body, and an adjusting operation.

The adjusting operation comprises sensing a value for a first radial xy-position of a longitudinal cylinder axis of the glass cylinder or of a test glass cylinder in a first horizontal sensing plane, softening the glass cylinder or the test glass cylinder in the heating zone, with the longitudinal axis thereof extending through the heating tube and through the first xy-position in the first horizontal sensing plane, and drawing the glass cylinder or the test glass cylinder arranged in the first xy-position into a test glass strand. In addition, the following steps are carried out once or repeatedly. These steps comprise

a) measuring an actual state of a radial circular or annular dimension of the test glass strand,

b) determining a deviation between the actual state and a desired state of the circular or annular dimension relative to a magnitude and position of said deviation relative to an inner wall of the heating tube during drawing,

c) calculating a corrected xy-position of the longitudinal cylinder axis on the basis of a correction factor and the magnitude and position of the deviation, with the corrected xy position being such that heating of the glass cylinder or the test glass cylinder extending through the heating tube with the longitudinal axis thereof in the corrected xy-position is improved,

d) repositioning the glass cylinder or the test glass cylinder in the heating tube such that the longitudinal cylinder axis extends at least in the first horizontal sensing plane in the corrected xy-position, and

e) drawing the glass cylinder or the test glass cylinder in the corrected xy-position to obtain a further test glass strand.

In addition, claim 1 further recites that the test glass strand is tubular, and the measurement of the actual state of radial circular or annular dimension of the tubular test glass strand comprises measuring its wall thickness.

As was expressed during today's interview, the method recited in claim 1 improves the quality of cylinders produced by drawing by improving the dimensional uniformity of the tube by improving the heating of the cylinder during drawing, and is not suggested by the prior art. Reconsideration of the rejection is therefore respectfully requested.

Bogdahn shows a system in which a tube is drawn and the wall thickness is detected by device 11. See FIG. 1. This information is used to control the speed of drawing, and the temperature and pressure of the operation. See e.g., in FIG. 1, the parts associated with reference numbers 9, 11, 22 and 15.

Bogdahn, however, nowhere suggests of any correction of *an xy-position* of the tube in a horizontal plane based on those measurements. Bogdahn therefore fails to suggest the claimed method directed to adjusting the xy-position of the cylinder being drawn.

Yamamura shows an apparatus for drawing a glass rod. In the Yamamura apparatus, as seen in Fig. 5, glass material 102 is supplied by a hanging mechanism 134 into an elongating furnace 130. See col. 6, lines 44 to 54. An elongating mechanism 140 pulls a glass rod of a reduced diameter from the furnace 130 during the drawing process. See col. 5, lines 55 to 58.

At setup, Yamamura adjusts the apparatus using a perfectly straight metal or ceramic standard rod 138. See col. 7, lines 44 to 50. This standard rod 138 is placed on the hanging mechanism 134, and the hanging mechanism a134 and the elongating mechanism 140 that draws the rod from the glass material are adjusted in position so that the standard rod 138 held by the device extends exactly along the *vertical centerline axis* of the device. See col. 8 lines 1 to 16.

After this initial setup, the glass rod 106 is drawn by rollers 144a and 144b. Col. 8, lines 17 to 21, col. 9, lines 53 to 55.

During the elongation process, the position control unit 158 calculates the deviation between the center of the rod as it is taken off and the elongating axis 154, i.e., *the vertical centerline* through the elongating device. See col. 10, lines 6 to 9. Where there is deviation

from the centerline, the speed of the rollers 144a and b is also controlled to bring the rod back to the vertical centerline 154. See col. 10, lines 9 to 16. Deviation from the centerline indicates bending, which is undesirable. See col. 10, lines 17 to 36. Yamamura's system therefore is essentially directed to keeping the rod in a geometric centerline of the elongating apparatus.

In contrast, the method of claim 1 requires calculation of a corrected xy-position such that heating of the glass cylinder or the test glass cylinder extending through the heating tube with its longitudinal axis in the corrected xy-position is improved.

Bogdahn says nothing about xy-position, and Yamamura's system does calculate a corrected xy-position, but simply teaches pulling a rod along a predetermined centerline path of its device. The references therefore do not suggest the claimed method.

Reconsideration of the rejection of claim 1 and its depending claims 5 to 11, 18 and 19 is therefore respectfully requested.

Claim 20 as amended recites a method for drawing a glass body from a glass cylinder that comprises positioning the glass cylinder in a vertically oriented heating tube, feeding the glass cylinder continuously to a heating zone in the heating tube and softening the glass cylinder therein, drawing a glass strand from the softened glass cylinder, and cutting the glass strand to size to obtain the cylindrical glass body. The positioning of the glass cylinder comprises drawing a test strand from the cylinder or from a test cylinder supported with a longitudinal axis extending vertically through an xy-position in a generally horizontal sensing plane, measuring a geometrical attribute of the test strand, deriving a deviation of the geometrical attribute from a desired value of said geometrical attribute, deriving a corrected xy-

position from the deviation, and positioning the cylinder or the test cylinder so that the longitudinal axis thereof extends through the corrected xy-position. The geometrical attribute includes a data value indicative of lopsidedness and a data value indicative of the orientation of lopsidedness relative to the heating tube. The test strand is tubular, and the data value indicative of lopsidedness is derived from a plurality of measurements of wall thicknesses of the tubular strand.

For reasons similar to those set out previously, Bogdahn does not suggest any adjustment of an xy-position of the tube being drawn, and Yamamura does not suggest calculating a corrected xy-position, but simply tries to keep the elongated rod in the centerline of the device without regard to the effect on the quality of the resulting drawn product.

Claim 20 therefore distinguishes over these references, together with its dependent claims 21 and 24.

All claims herein having been shown to distinguish over the prior art in structure, function and result, formal allowance is respectfully requested.

Should any questions arise, the Patent Office is invited to telephone attorney for applicants at 212-490-3285.

Respectfully submitted,

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